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ABSTRACT

Continuity is one of the great facilitators of educational impact--measurable phenomena of positive or negative value which follow the completion of a project or program. It is assumed that continuity in educational research leads to accumulations of (1) research skills, (2) knowledge about previous related research, (3) contacts with like-minded researchers, and (4) data sources. It is further assumed that such accumulations increase the probability that the researcher-produced knowledge will be useful, the researcher will disseminate results, and results will have impact on (modify) educational practice. Accumulations have not come about in vocational education research because of lack of continuity (a succession of research projects which form a coherent whole). Research projects are more likely to have impact if there is continuity of effort on the part of the researcher, continuity of goals and funding on the part of organizations which fund research, continuity of successful research results reported to consumers, and continuity of evaluations. It is further recommended that there be continuity in impact specifications. That is, the format for specifying actual impacts should reflect the format for specifying intended impacts. (YLB)

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Effects of Continuity on the Impact of Vocational Education Research*

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Vocational educators who prepare research proposals for federal funding have been mandated to include descriptions of the probable impact their research will have on classroom or other learning situations within five years after funding has been terminated. Consequently, some researchers are investigating "impact" in terms of what it is, how it can be measured, how it can be predicted, and how it can be facilitated. This paper discusses one aspect of facilitation of impact.

Dick (1976) defined impact as measurable phenomena--of positive or negative value--which follow the completion of a project or program. According to Dick, these phenomena (dependent variables) will not occur in the absence of the project or program (independent variable). Miller and Miller (1974) concluded that impact has at least two broad parameters--intended impact and actual impact. Their concept of impact is distinctly different than Dick's, for it is clear that Dick considered impact to be actual impact. However, both studies described similar methods of assessing impact and emphasized that evaluators need access to data on intended impact in order to find evidence of actual impact.

It is assumed here that one of the great facilitators of educational impact is continuity, and that continuity has several dimensions. First, let us consider continuity in general, and then examine some of its dimensions.

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Webster has defined continuity as an "unbroken, coherent whole" (1968), or an "uninterrupted succession" (1977). It is assumed here that continuity in educational research leads to:

-- an accumulation of research skills

-- an accumulation of knowledge about previous related research

-- an accumulation of contacts with like-minded researchers

-- an accumulation of data sources

It is further assumed that such accumulations increase the probability that:

-- the knowledge produced by the researcher will be useful

-- the researcher will be interested in disseminating the results

-- the results will have impact on (that is, modify) educational practice.

Unfortunately, such accumulations have not come about in vocational education research because of a lack of continuity (a succession of research projects which form a coherent whole). There are several dimensions of continuity. Among these are: continuity of effort, continuity of goals, continuity of funding, continuity of results, continuity of evaluation, and continuity of impact specifications. Each of these dimensions is discussed below.

Continuity of Effort

A long-term research effort which does not have impact as a goal may well have more actual impact than discontinuous research which claims to have impact as a goal. McCaslin et al., (1976) studied characteristics of higher versus lower impact projects conducted by Kentucky's Research and Development Unit from 1967 to 1975. They found that 100% of the high impact projects and 40% of the low impact projects were sponsored by organizations

which had conducted prior research. They also found that the turnover rate for project staff was 20% for high impact projects and 80% for low.

Some researchers and some research organizations are noted for their tendency to jump from one topic to another. These changes of direction in research are not likely to pose any major problems if they are in response to previous work done by the researcher, or if the new topic utilizes a high proportion of the skills possessed by the researcher. On the other hand, when the researcher (or research organization) is responding to "Requests for Proposals" (RFPs) almost willy-nilly, and when the principal goal is to attract research funding regardless of topic, continuity is almost certain to be lacking. Compounding the problem is that as soon as funding is secured, many researchers turn to a new set of topics in order to prepare proposals for funding for the ensuing year. At the same time, they try to produce a halfway respectable final report for the current year. Such researchers may place more value on "peer impact" than educational impact, that is, they may try to impress their peers with their ability to secure funding year after year, rather than on the educational effects of such funding. Or, continuous funding may be necessary to protect jobs or even to ensure survival of the research organization.

It is difficult to see how a researcher who really seeks educational impact can choose deliberately to jump frequently from one topic to another. The researchers (and the research organizations) who doggedly follow the same general line of effort year after year are more likely to have peer and educational impact whether they seek them or not. One obvious reason for the pay-off of continuing effort is that a researcher who stays with the same general line of research over several years becomes a real expert in it. That is, the researcher comes to know the previous research, the other researchers who are working on this topic, the profitable ways of

collecting data, and the publics who are most likely to use the results. The researcher who changes topics frequently has to seek this information anew each time the topic is changed.

What motivates researchers and research organizations to change topics? Do researcher organizations which operate for a profit seek greater or less continuity of research goals than nonprofit organizations? Do research organizations which have basic support from tax or foundation funds exhibit greater or less continuity of research goals than those which must charge all of their overhead to research contracts? While these questions have not been researched to the extent that they can be fully answered, some studies have examined the continuity of goals of organizations which fund research.

Continuity of Goals

In 1975 the National Academy of Sciences studied "manpower research" conducted by the Department of Labor (DOL), and in 1976 they studied "vocational education research" conducted by the Department of Health, Education, and Welfare (DHEW). They found far greater continuity in DOL than in DHEW. During the decade studied, DOL had one administrator, DHEW had many. More importantly, the goals of DOL were remarkably constant year after year, while the goals of DHEW shifted almost annually. Indeed, for several years, it was DHEW policy that whatever had been a priority in vocational education research one year could not be a research priority in the following year. In ten years of vocational education research (1965 to 1974) the only research priority which was pursued in a majority of the years was vocational guidance. It would not appear to be a coincidence that the major research area in which substantial progress was made from

1965 to 1974 was vocational counseling, guidance and development. Was this cause or effect? That is, did repeated funding of this research area lead to cumulation of results, or did the promise of cumulative results lead to continued funding? Probably the answer is some of each.

It seems reasonable to expect, however, that cumulative results are unlikely to arise when research priorities are changed frequently. Indeed, frequent changes in research priorities by the funding agency would be likely to encourage researchers (and the research organizations which employ them) to leave promising results in limbo in order to gear up to get next year's funds. Researchers who could not (or would not) leave their current research goals to pursue the promised new funding might not find money to pursue their research. Indeed, they might even become unemployed because they did not bring in research dollars. The practice of frequently changing research priorities rewards proposal writers to such an extent that they frequently seem to seek dollars by promising to do research for which the research organization is not qualified. There is a high probability that research produced under these conditions would have more impact on peers within the research organization than on education.

It is, of course, possible that research areas will become "mined out" if research priorities are seldom changed. The ideal solution would appear to be a mixed strategy in which an established research priority is funded until it is yielding decreased pay-offs, and new research priorities are funded long enough to see if they pay-off in terms of educational impact. It would seem then that continuity of goals should be accompanied by continuity of funding.

Continuity of Funding

Planning in terms of research programs rather than research projects adds to the continuity of research. There needs to be a better balance in the funding of program components. Miller and Miller found that most funds are directed to the development and implementation of solutions to problems. Proportionately little money is spent in identifying or investigating educational problems or evaluating "attempted solutions" to problems. In order to be funded, a proposed research project should specify a program of research which represents a coherent whole. That is, assumptions about a problem need to be validated, clarified, and changed into researchable questions before a solution is developed, demonstrated and evaluated.

Battelle (1973) analyzed ten innovations which have had high impact on society and found twenty-one factors which were important to the direction and rate of impact. Continuity (and availability) of funding ranked fifth among these factors. Battelle pointed out that funding need not be munificent in the early stages of a research program but that it should permit R&D to proceed. Battelle concluded that such funding probably aids the innovative process by the confidence it generates in an R&D team.

The Illinois Institute of Technology Research Institute (IITRI, 1968) and the Battelle Memorial Institute (1973) have described a program of research as consisting of: nonmission research which provides the origins from which science and technology can advance toward innovations, mission-oriented research which develops information for a specific application of a concept prior to development of a product or process, and development and application research which involves prototype development directed toward the demonstration of a specific process or product for purposes of marketing.

These definitions seem to parallel what educational researchers have called basic research, applied research, and development projects. At the same time that IITRI and Battelle concluded that the funding of nonmission research was vital to the conception of innovations, they also found that long periods of time were involved in programs of research. For example, Battelle found that the number of nonmission (basic) research projects peaked between the twentieth and thirtieth year preceding the innovation, that mission-oriented (applied) and development research projects peaked during the decade preceding the innovation, and that the average time from conception of an innovation until a demonstration of it was nine years. In the Battelle study, only one of the ten innovations which was analyzed was a social science process, and it took twenty-eight years from the time of its conception to the time of demonstration. The point of this discussion is that continuity of funding for a program of related research projects is vital to high impact and that evidence of this impact may not be evident for more than a decade.

Copa (1978) introduced another consideration related to the continuity of funding. He suggested that low returns (impacts) from investments in vocational education research are due to a lack of continuity between funding patterns and delivery systems for vocational education. He observed that for the past ten years (1968-1978), most of the vocational research investments have been in "across-the-board" projects rather than in "subject-matter specialties." Copa hypothesized that returns (impacts) at the classroom level are greater for subject-matter investments than for across-the-board investments because those investment patterns match the delivery system. Most educational agencies continue to be organized according to subject-matter.

It is further suggested that funding complete programs of research (basic, applied and developmental) in patterns which match the delivery system will also facilitate continuity of research results.

Continuity of Results

The Cooperative Extension Service has existed for many decades. It probably could not have continued to exist without a continuing flow of research results which could be passed on to and accepted by farmers. But in its early days, it was not trusted by farmers. A major factor in the trust which exists today almost certainly is the very fact of the continuity of research results. When activities of farmers are impacted successfully by research results reported by the Cooperative Extension Service, they are more likely to accept the next piece of research. This suggests that a continuing flow of research results is more likely to have impact than is an isolated research finding. It also seems likely that to the extent a program disseminates results of poor quality research, its subsequent research will have less probability of impact.

When we begin to consider the quality of a piece of or a program of research, we enter the realm of evaluation. The practice of evaluating the quality of research while it is being conducted (as well as after it is completed) is a fairly new notion, and presents still another dimension of continuity.

Continuity of Evaluation

Scriven (1967) distinguished formative evaluation from summative evaluation. Hastings (1978) stated that the role of formative evaluation is to help the developers of a product, process, or a program improve their "thing" during the process of development, and the role of summative evaluation is to help the potential user to decide whether or not to use (purchase) these developed materials, processes, or programs.

In practice, the distinctions between formative and summative evaluations are not so obvious. A funding agency is likely to use both in trying to decide whether or not to continue funding a project's operations or to disseminate its results. Dick (1976) concluded that evaluating programmatic impact in education is summative rather than formative evaluation. It was Dick's thesis that the impact of (summative) evaluation is strengthened to the extent that formative evaluation is employed and that it is weakened to the extent that formative evaluation is not employed. Dick advocated continuous evaluation of a project and suggested using two evaluators--one internal and one external. The internal evaluator collects raw data and is part of the project team. He/she should be involved as early as the proposal-writing stage of the project. The external evaluator rarely collects raw data but does examine it for accuracy and reports to the funding agency.

Dick pointed out other (more important) functions of the external evaluator. There is a likelihood that the external evaluator will identify problems which have gone undetected by project personnel. Through discussions with a variety of staff and users, he/she can gain a unique perspective on the project and provide insight into difficulties. Often, the external evaluator can informally suggest alternative solutions which might not otherwise have been considered.

It was Dick's contention that impact is next to impossible to assess if evaluation of research is ex post facto. Given this understanding of the relationship between impact (summative evaluation) and continuous (formative) evaluation, it is easier to comprehend why "impact studies" of the past have found so little evidence of impact in classroom or other

learning situations. It is also unreasonable to expect researchers to "go back and look again." We can predict that they will still not find much evidence of impact because both baseline data and outcome data are needed, but are absent. Dick (1976) emphasized the importance of evaluators having access to process data, but Miller and Miller went a step further. They emphasized the need for planning data and concluded that "clear criterion measures" should be established before funding. Miller and Miller suggested that states should develop standard formats for specifying intended impacts. Taking their suggestion a step further, it is recommended here that there be continuity in impact specifications. That is, the format for specifying actual impacts should reflect the format for specifying intended impacts.

Continuity of Impact Specifications

Miller and Miller (1974) developed guidelines for specifying impacts by suggesting that project proposals and reports should routinely include concise listings of:

1. The objectives of the project and a measure of how well those objectives will be (or were) reached.

2. The numbers of schools, staffs, and students who will be (or were) involved and the proportion those are (or were) of the total in the district or state.

3. The previous research which will be (or was) specifically used as a resource for the project.

Miller and Miller concluded that:

> Impact--actual measurement of change--should be a required part of all projects, with teeth built in and funding provided.

> That is, if the impossibility of measuring impact is not agreed upon at the outset of the project, those who proposed the project should be held accountable for impact. They should be penalized when they do not take the time to measure it, or when they were wrong in saying the impact could be measured. (p. 59)

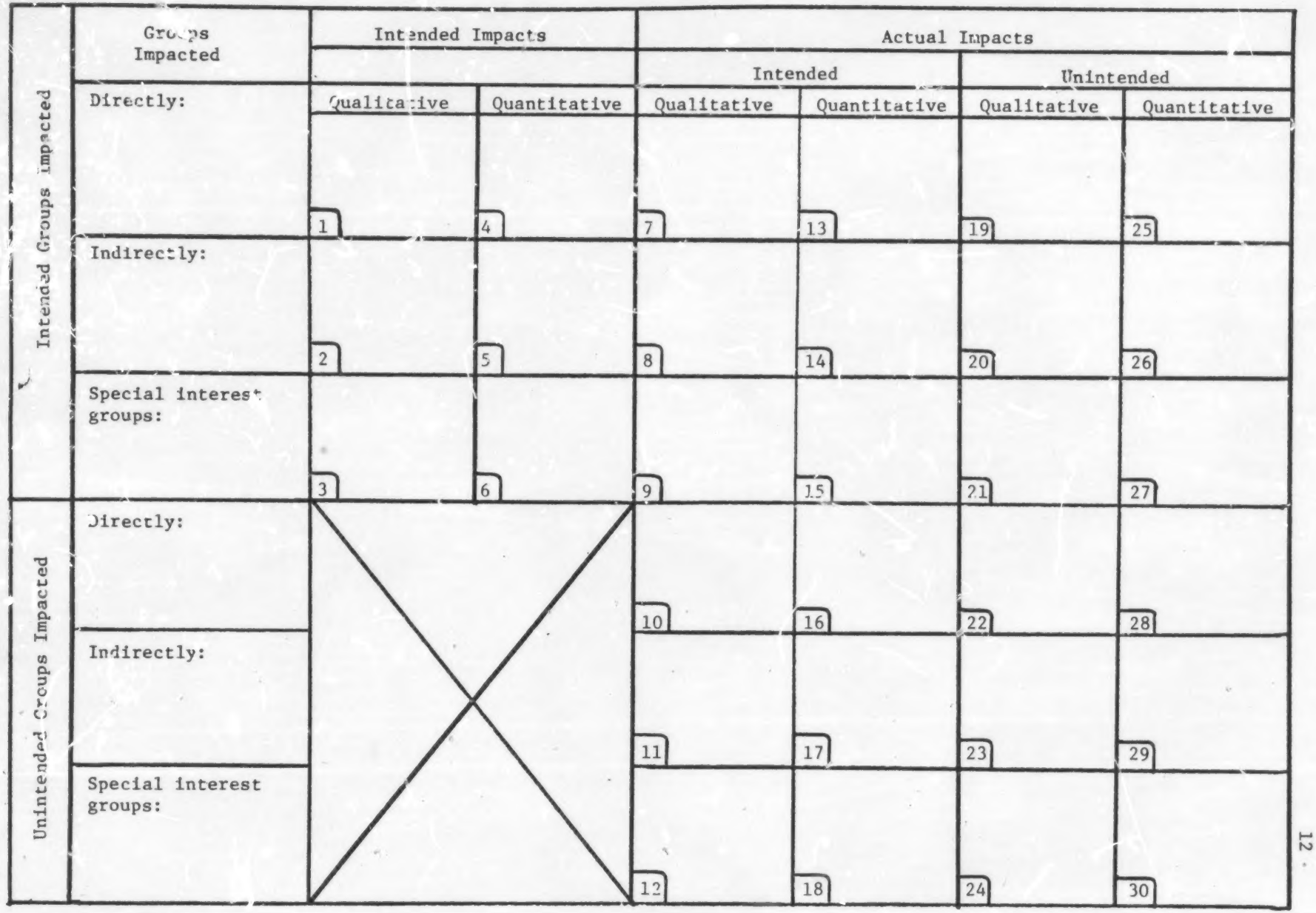
De Neufille and Stafford (1971) developed an impact-incidence matrix which was included in Systems Tools for Project Planning (Delp et al., 1977). Researchers at the University of Illinois have adapted the tool for specifying both intended and actual impacts (see Figure 1). The matrix provides numbered cells for recording observable (qualitative) as well as measureable (quantitative) data. Because so many innovations have been accidental (or coincidental) discoveries, the researchers decided that cells should also be provided for unintended impacts. Also included in the matrix are cells for indicating target groups to be impacted. By having format continuity for specifying intended as well as actual impacts, it should be possible to look across programs of research and measure or observe their general as well as their unique types of impact. By using the numbered-cell format, it should be possible to store and retrieve impact data with microforms or computers. If such a system were to be developed on a statewide level, evaluation of impacts which have or have not been sustained for five years following the termination of funding should be greatly facilitated.

Summary and Recommendations

If educational research is to have positive educational impact, it should be characterized by continuity. It should have continuity as a whole. Almost every project should be part of a coherent program of

Figure 1

IMPACTS



Impact Specification Matrix

research in which problems are adequately investigated before solutions to them are demonstrated. Such programs of research are more likely to have impact if there is continuity of effort on the part of the researchers, continuity of goals and funding on the part of organizations which fund research, continuity of successful research results reported to consumers, and continuity of evaluations.

Some significant steps have been taken in recent years to facilitate continuity of research. Several years ago USOE abandoned its policy of not having the same priority for two consecutive years. Congress, through law and legislative history virtually has ensured that some of its concerns, e.g., vocational sex equity, will be addressed by research projects for five years or more. In 1979 USOE-BOAE announced research priorities which are broad enough and important enough to warrant attention for several years, and has sponsored a seminar on continuity of research. The National Center for Research on Vocational Education has high probability of funding for five years, with the possibility that some research topics can be addressed continuously for several years. Illinois, by specifying and tracking impact of research, is likely to hasten the demise of projects which do not have impact, but also to give continuity to research efforts which do demonstrate impact.

Each of these steps seems desirable, but much remains to be done to increase continuity of effort, of goals, of funding, of reporting of results, and of evaluation of research. If researchers and the organizations which fund their research incorporate these facilitators of impact into their research designs, they should be increasingly able to predict as well as assess the <u>actual</u> impacts of vocational education research projects and programs.

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